The Art of Surprise

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Sun Tzu

If ignorant both of your enemy and yourself, you are certain in every battle to be in peril

OCTOBER 4, 1957

19:28:34 UTC

STRATEGIC SURPRISE

February 7, 1958 – DoD Directive 5105.15

February 7, 1958
NUMBER 5105.15

Department of Defense Directive

SUBJECT Department of Defense Advanced Research Projects Agency

I. PURPOSE

The purpose of this directive is to provide within the Department of Defense an agency for the direction and performance of certain advanced research and development projects.

II. RESPONSIBILITY AND AUTHORITY

A. Establishment

In accordance with the provisions of the National Security Act of 1947, as amended, and Reorganization Plan No. 6 of 1953, there is established in the Office of the Secretary of Defense the Department of Defense Advanced Research Projects Agency. The Agency will be under the direction of the Director of Advanced Research Projects.

B. Responsibility

The Agency shall be responsible for the direction or performance of such advanced projects in the field of research and development as the Secretary of Defense shall, from time to time, designate by individual project or by category.

C. Authority

Subject to the direction and control of the Director:

1. The Agency is authorized to direct such research and development projects being performed within the Department of Defense as the Secretary of Defense may designate.

2. The Agency is authorized to arrange for the performance of research and development work by other agencies of Government, including the military departments, as may be necessary to accomplish its mission in relation to projects assigned.

3. The Agency is authorized to enter into contracts and agreements with individuals, private business entities, educational, research or scientific institutions including federal or state institutions.

4. The Agency is authorized to acquire or construct such research, development and test facilities and equipment as may be approved by the Secretary of Defense, in accordance with applicable statutes. However, existing facilities of the Department of Defense shall be utilized to the maximum extent practicable.

III. ORGANIZATION

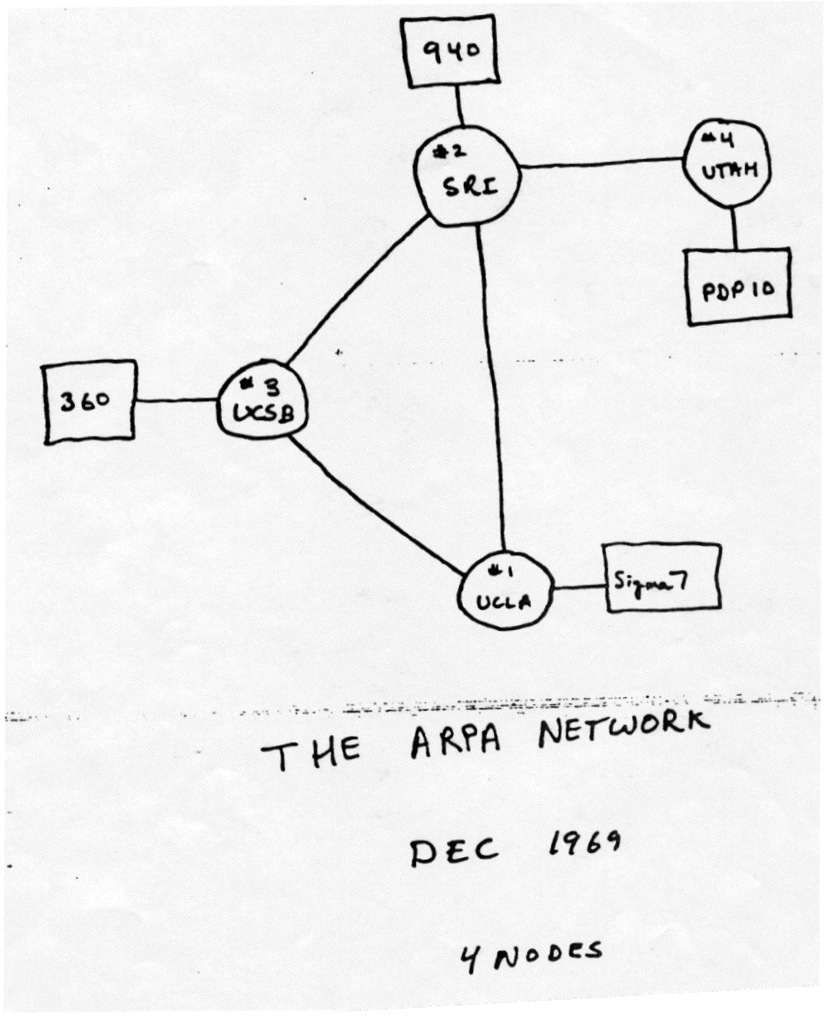
A. The Director of Advanced Research Projects shall report to the Secretary of Defense.

B. The Department of Defense Advanced Research Projects Agency shall be provided such personnel and administrative support as may be approved by the Secretary of Defense.

C. Other officers and agencies of the Office of the Secretary of Defense within their respective areas of responsibility shall provide support to the Director of the Advanced Research Projects Agency as may be necessary for him to carry out his assigned functions.

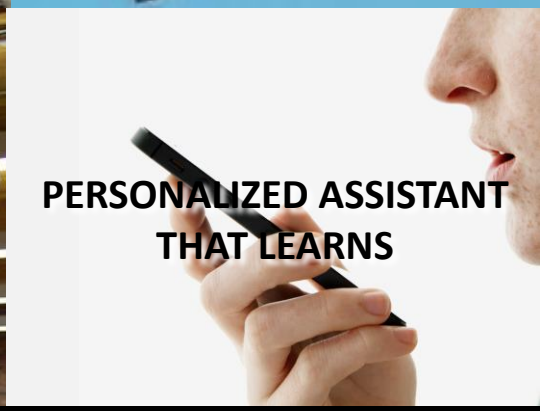
IV. EFFECTIVE DATE

This directive is effective immediately.



THE INTERNET
1969

DARPA History



DARPA

Sun Tzu

Quickness is the essence

430 msec

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DARPA

DARPA

Plan X

High Assurance Cyber Military Systems

Sun Tzu

Use the extraordinary to win

What it takes to end an AIDS epidemic p. 220 | Polar bears suffer through lean summers p. 295 | Sperm produced in ovary of mutant fish p. 324

Science

$10
17 JULY 2015
sciencemag.org
AAAS

SPECIAL ISSUE

ARTIFICIAL INTELLIGENCE

DARPA Grand Challenges 2004 – 2007

Grand Challenge
2004

Grand Challenge
2005

Urban Challenge
2007

Today…

DARPA

Probabilistic Programming for Advancing Machine Learning

Tools to program without being an expert

Lane finding algorithm

Baseline:

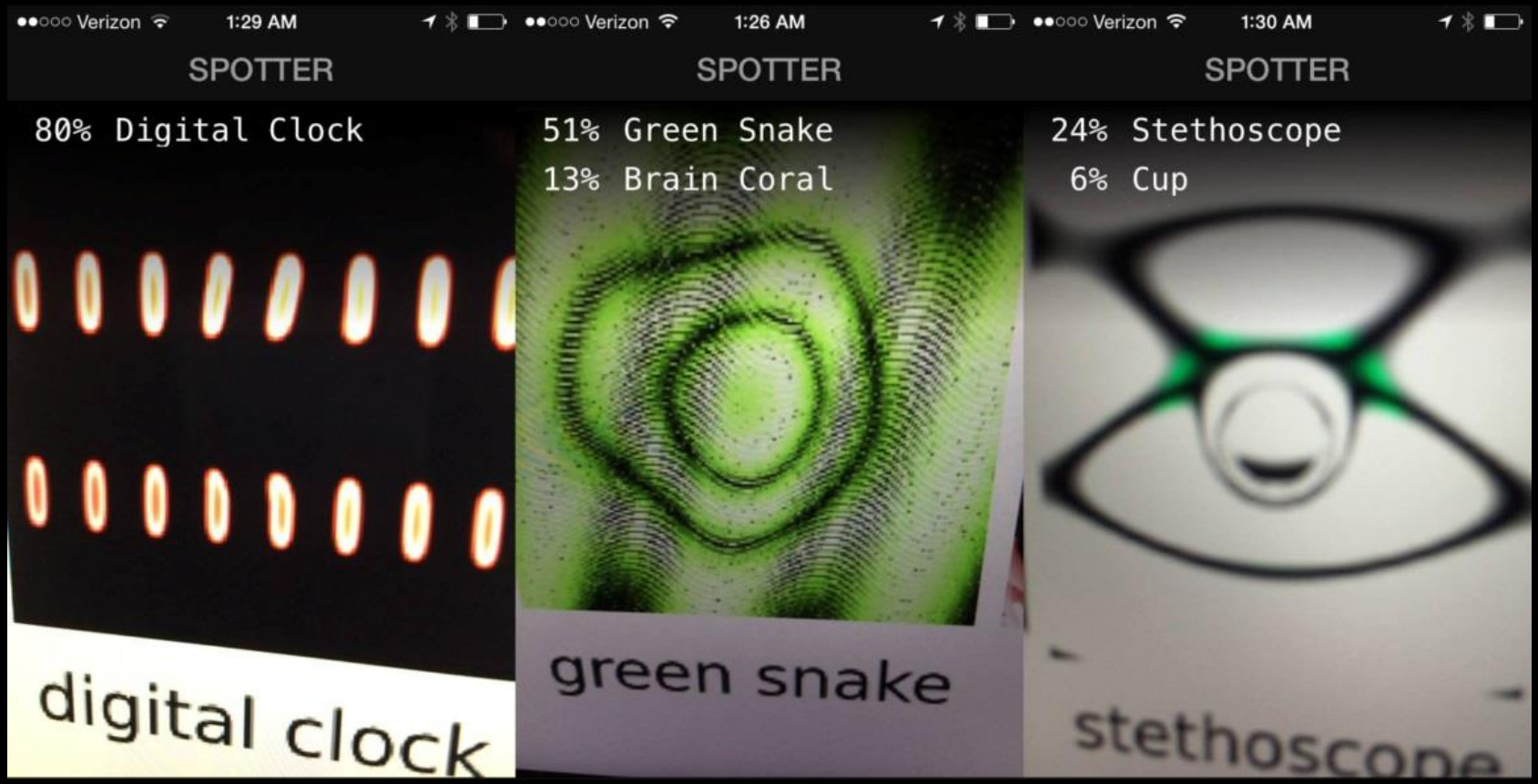
10,000 lines of code, C++

Using PPAML:

Model: ~20 lines of code,

Library: ~100 lines of code (model-specific), plus 10% more accurate

Explainable AI



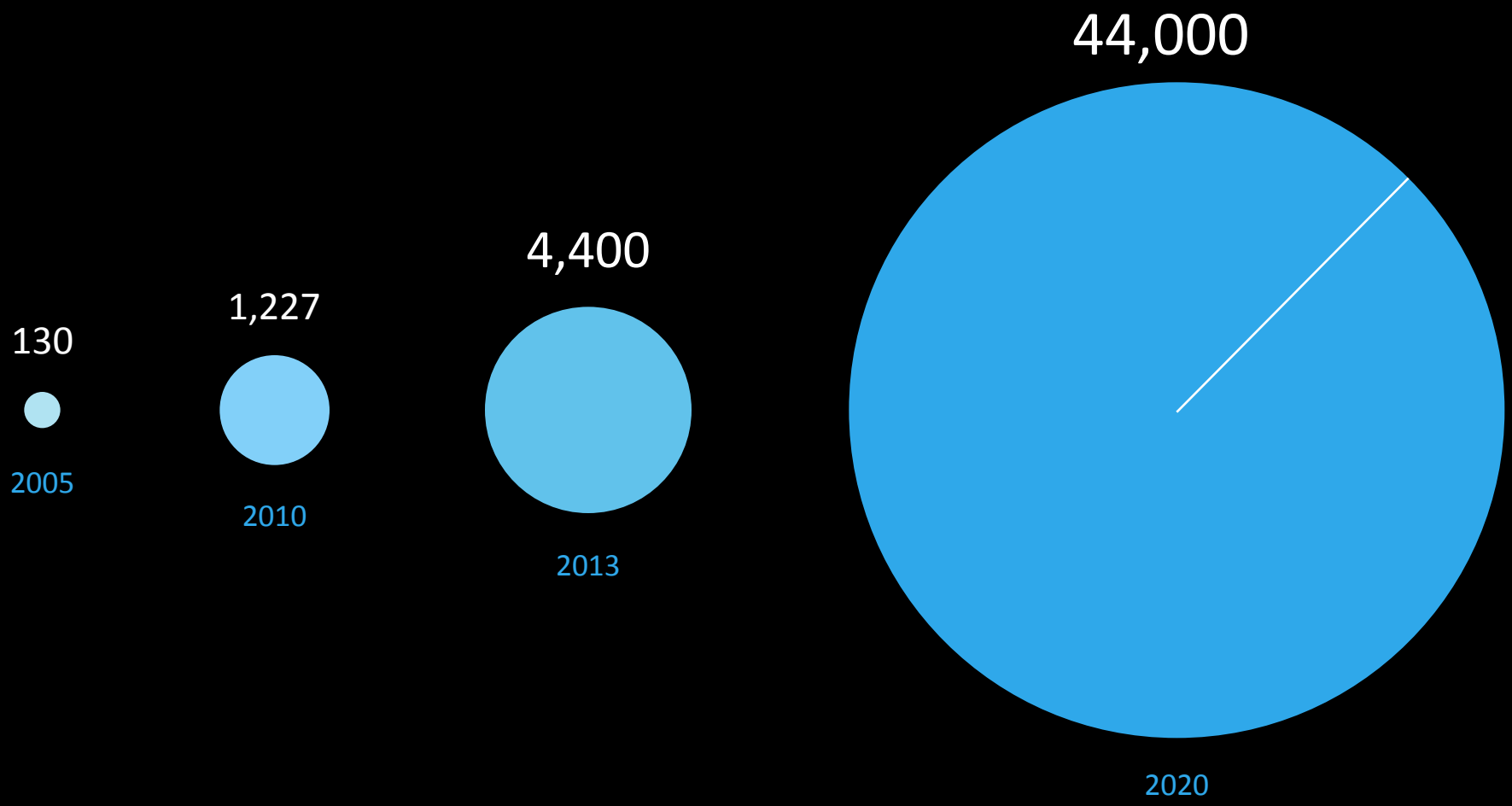
http://devblogs.nvidia.com/parallelforall/wp-content/uploads/2015/08/Clune_Fig4.jpg

Communicating with Computers

Sun Tzu

With many calculations,
one can win

Data is Exploding



Quantity of Global Digital Data, in Exabytes

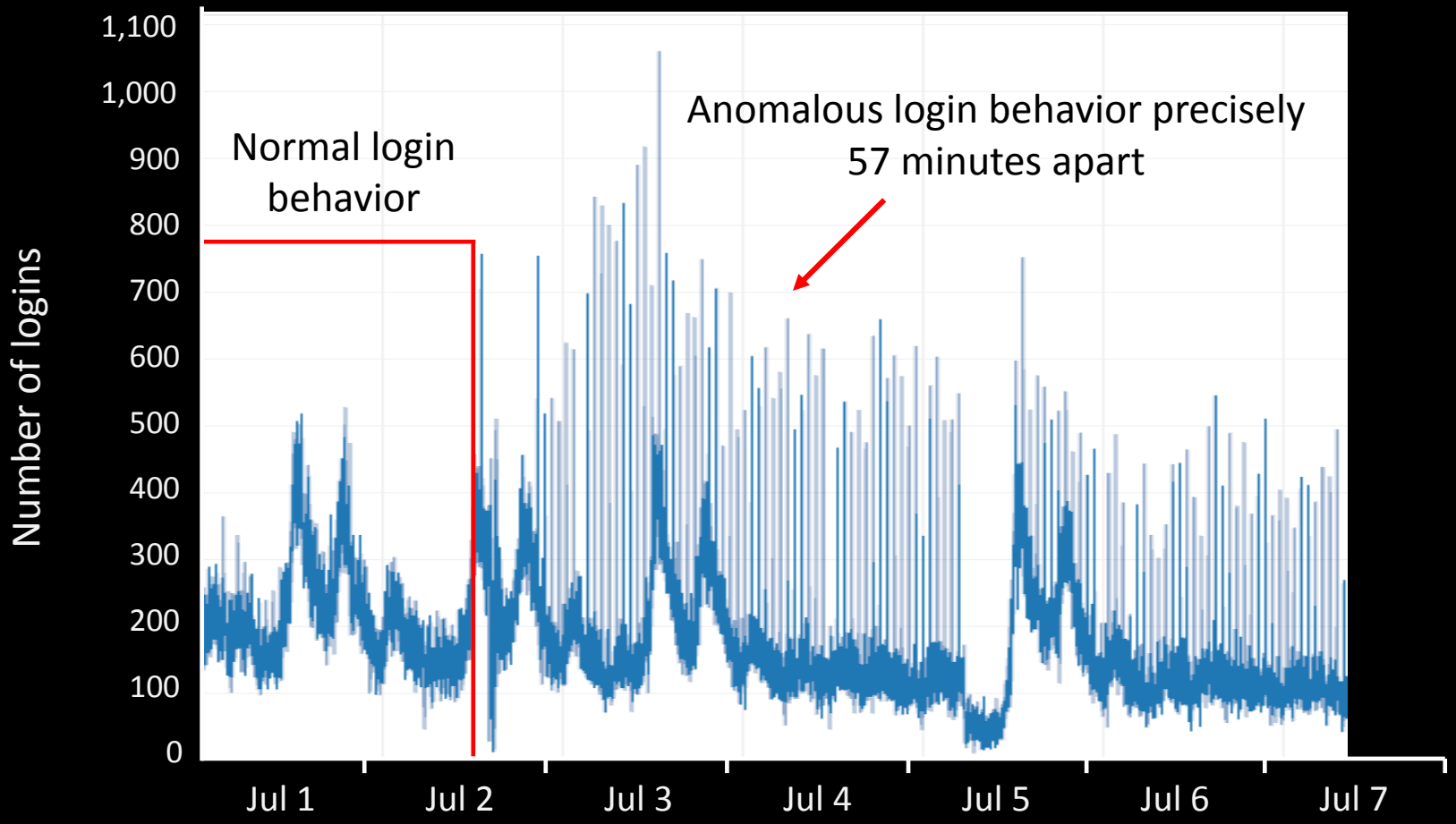
EXABYTE = 1,000,000,000,000,000,000 BYTES

DARPA

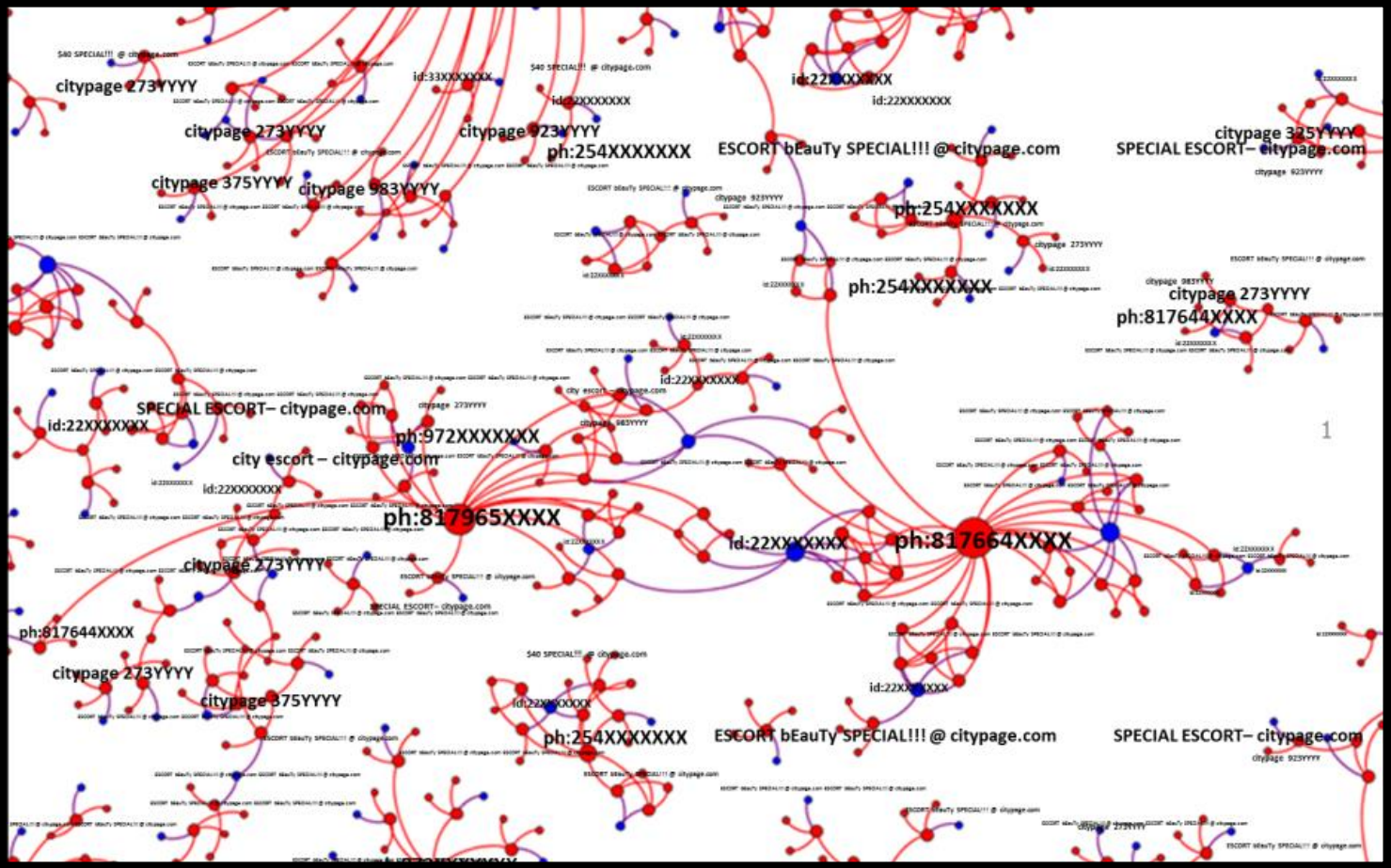
Network Defense

Detecting Network Infiltration:

Single unauthorized IP address hidden in 87.9 billion network logs

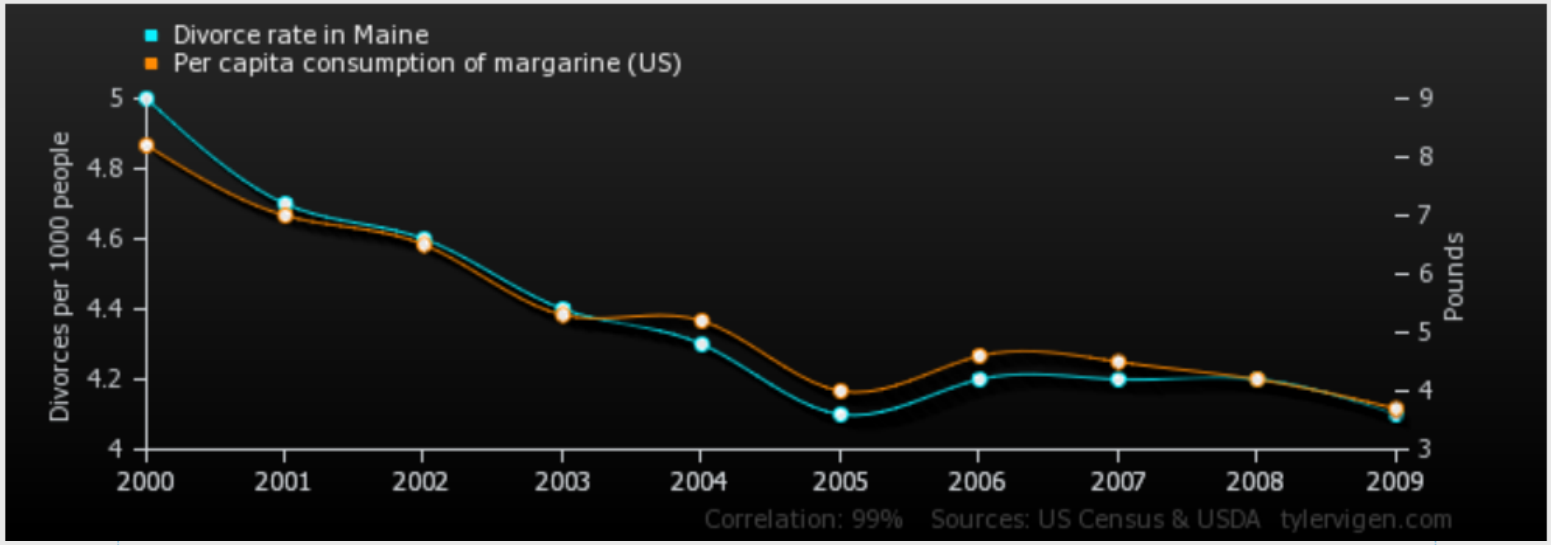


Memex



Correlations can be misleading

Divorce rate in Maine
correlates with
Per capita consumption of margarine (US)



Correlation: 0.992558

Big Mechanism

Sun Tzu

If you know the enemy and know yourself, you need not fear the result of a hundred battles

The art of surprise

Open source code for the community